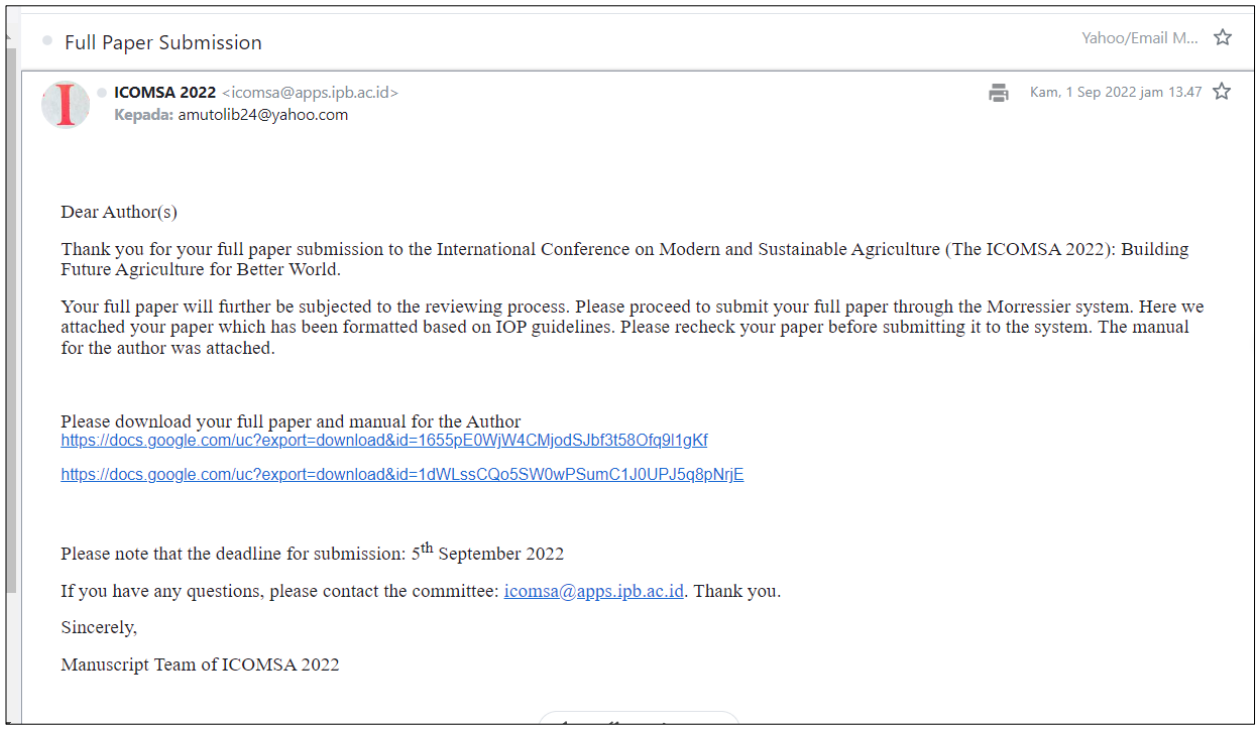
1. Submit Naskah Pada ICOMSA Conference 2022



Full Paper Submission

Yahoo/Email M...

ICOMSA 2022 <icomsa@apps.ipb.ac.id>
Kepada: amutolib24@yahoo.com

Kam, 1 Sep 2022 jam 13.47

Dear Author(s)

Thank you for your full paper submission to the International Conference on Modern and Sustainable Agriculture (The ICOMSA 2022): Building Future Agriculture for Better World.

Your full paper will further be subjected to the reviewing process. Please proceed to submit your full paper through the Morressier system. Here we attached your paper which has been formatted based on IOP guidelines. Please recheck your paper before submitting it to the system. The manual for the author was attached.

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Please note that the deadline for submission: 5th September 2022

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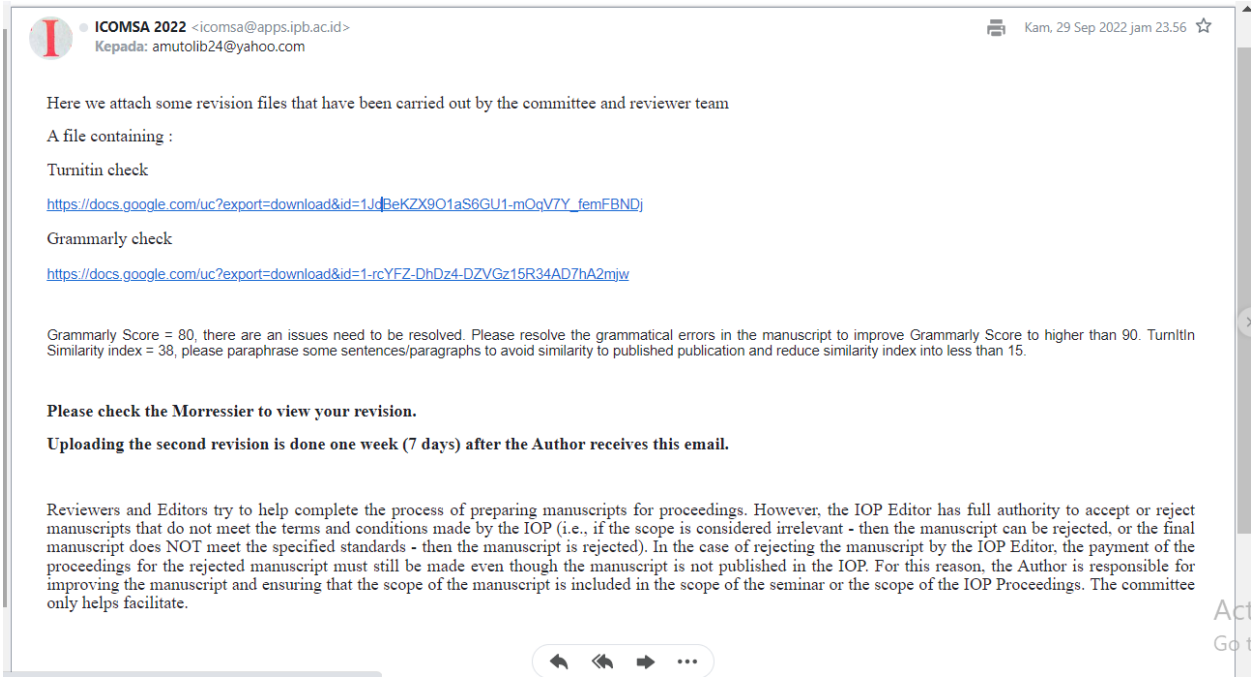

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Kam, 29 Sep 2022 jam 23.56

Here we attach some revision files that have been carried out by the committee and reviewer team

A file containing :

Turnitin check

https://docs.google.com/uc?export=download&id=1JdBeKZX9O1aS6GU1-mOqV7Y_femFBNDj

Grammarly check

https://docs.google.com/uc?export=download&id=1-rcYFZ-DhDz4-DZVGz15R34AD7hA2mjw

Grammarly Score = 80, there are an issues need to be resolved. Please resolve the grammatical errors in the manuscript to improve Grammarly Score to higher than 90. TurnItIn Similarity index = 38, please paraphrase some sentences/paragraphs to avoid similarity to published publication and reduce similarity index into less than 15.

Please check the Morressier to view your revision.

Uploading the second revision is done one week (7 days) after the Author receives this email.

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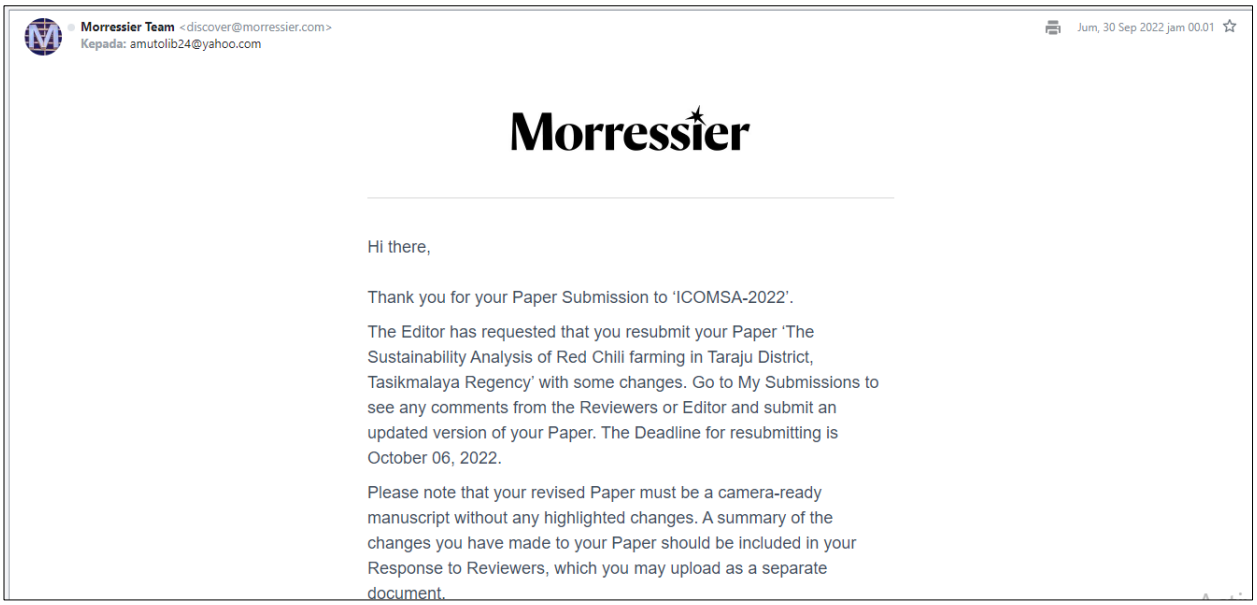

Morressier Team <discover@morressier.com>
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Jum, 30 Sep 2022 jam 00.01

Morressier

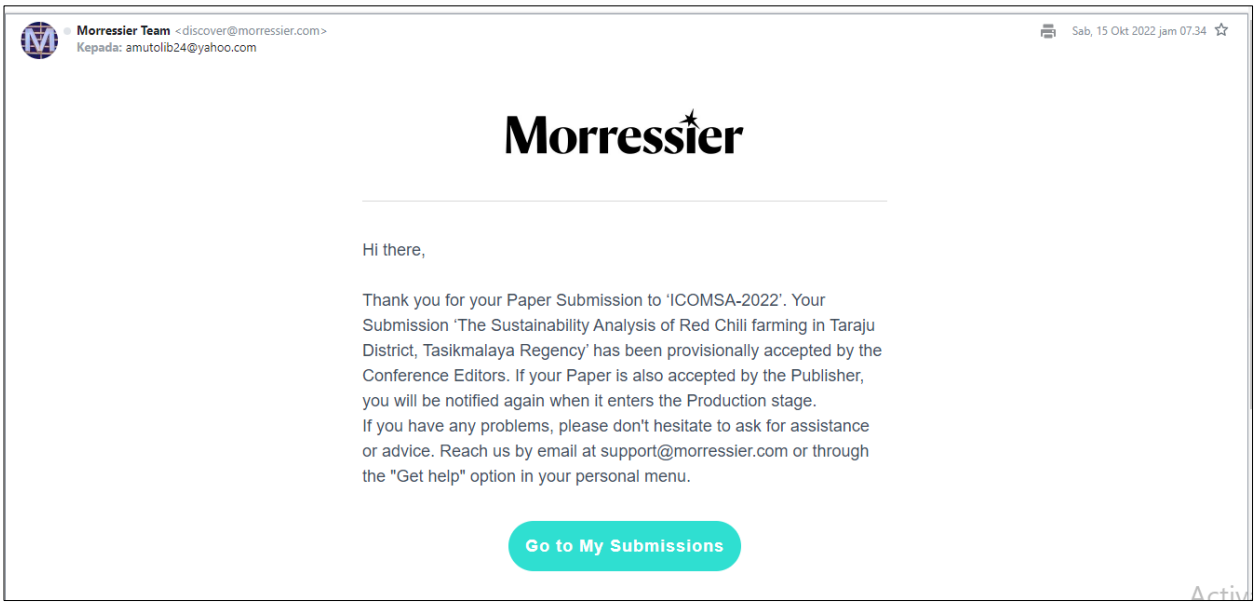
Hi there,

Thank you for your Paper Submission to 'ICOMSA-2022'.

The Editor has requested that you resubmit your Paper 'The Sustainability Analysis of Red Chili farming in Taraju District, Tasikmalaya Regency' with some changes. Go to My Submissions to see any comments from the Reviewers or Editor and submit an updated version of your Paper. The Deadline for resubmitting is October 06, 2022.

Please note that your revised Paper must be a camera-ready manuscript without any highlighted changes. A summary of the changes you have made to your Paper should be included in your Response to Reviewers, which you may upload as a separate document.

4. Submit Naskah yang telah diperbaiki



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Kepada: amutolib24@yahoo.com

Sab, 15 Okt 2022 jam 07.34

Morressier

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5. Naskah telah diterima oleh system IOP Proceeding

Acceptance Letter ICOMSA

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Dear Abdul Mutolib,

We are pleased to inform you that your manuscript has been accepted by the ICOMSA 2022 Editorial Boards. However, it still need approval by IOP to be published. Currently, your paper is in the editorial board and still on process to be published in the Scopus-Indexed conference proceeding: The Earth-Environmental Sciences IOP Conference Proceeding Series-The International Conference on Modern anad Sustainable Agriculture (ICOMSA 2022).

We will inform you about the progress of your manuscript in due time. Thank you for your kind cooperation.

Sincerely yours.

IOCMSA Committee

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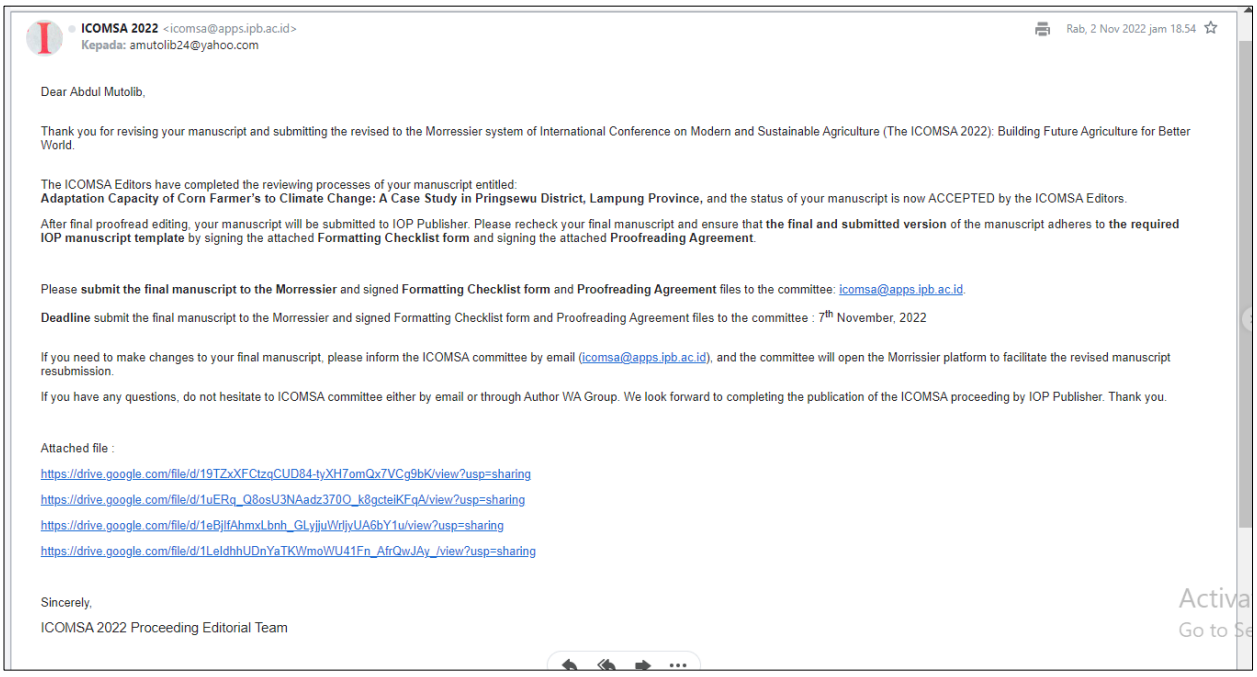

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Rab, 2 Nov 2022 jam 18.54

Dear Abdul Mutolib,

Thank you for revising your manuscript and submitting the revised to the Morressier system of International Conference on Modern and Sustainable Agriculture (The ICOMSA 2022): Building Future Agriculture for Better World.

The ICOMSA Editors have completed the reviewing processes of your manuscript entitled:
Adaptation Capacity of Corn Farmer's to Climate Change: A Case Study in Pringsewu District, Lampung Province, and the status of your manuscript is now ACCEPTED by the ICOMSA Editors.

After final proofread editing, your manuscript will be submitted to IOP Publisher. Please recheck your final manuscript and ensure that **the final and submitted version** of the manuscript adheres to **the required IOP manuscript template** by signing the attached **Formatting Checklist form** and signing the attached **Proofreading Agreement**.

Please **submit the final manuscript to the Morressier** and signed **Formatting Checklist form** and **Proofreading Agreement** files to the committee: icomsa@apps.ipb.ac.id.

Deadline submit the final manuscript to the Morressier and signed Formatting Checklist form and Proofreading Agreement files to the committee : 7th November, 2022

If you need to make changes to your final manuscript, please inform the ICOMSA committee by email (icomsa@apps.ipb.ac.id), and the committee will open the Morrissier platform to facilitate the revised manuscript resubmission.

If you have any questions, do not hesitate to ICOMSA committee either by email or through Author WA Group. We look forward to completing the publication of the ICOMSA proceeding by IOP Publisher. Thank you.

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Sincerely,

ICOMSA 2022 Proceeding Editorial Team

Activa
Go to Se

7. Certifikat Bukti mengikuti Oral Presentation

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in **The International Conference on Modern and Sustainable Agriculture (ICOMSA)**
"Building Future Agriculture for Better World"

August 2nd – 3rd ,2022 | Virtual Conference

Prof. Dr. Ir. Suryo Wiyono, M.Sc.Agr
Dean *ad interim* Faculty of Agriculture, IPB University

LAMPIRAN PERBAIKAN NASKAH

Reviewer's Comments

Manuscript No.: CRO 001 (ID 88)
Corresponding author:

1 Please rate your evaluations for the manuscript using the following criteria

No.	Criteria	Your evaluations (1: the least to 5: the best; write in remark for yes/no, for quantitative answers, and other notes)					Remarks
		1	2	3	4	5	
a	**Manuscript's title:**						
	Is the title reflecting the manuscript content?			X			Replace 'Farming' with 'Farmers'
	Is the title more than 20 words?						No, 16 words
b	**Abstract**						
	The abstract representing the manuscript content?				X		
	Is the Abstract more than 200 words?						Yes, 241 words. Please limit the abstract into 200 words (max.)
c	**Keywords**						
	Is keywords more than 5 phrases?						No keywords
	Keywords represent content of abstract/text and are not part of the title						Not available
d	**Introduction**						
	Introduction clear and supportive with the research objective			X			
	Introduction is concise enough (i.e. less than 2 pages)				X		Currently they are less than 600 words
	There are specific objective statement(s) in the introduction			X			Please state the Objective Statement clearly in the final paragraph of introduction
e	**Materials and Methods (MM)**						X
	The MM clear and relevance			X			
	The MM concise enough				X		
	The MM is appropriate			X			
f	**Results and Discussion**						
	The results and discussion are clear and supported with the relevance data?				X		
	Tables and Figures are cited in text and they are relevance and concise			X			Table 1 and 3 have not been cited in the text.
	The results and discussion are concise				X		
	Are there statements that should be added in the R & D? Please give specific suggestions						No
	Are there repetitive statements that should be removed in the R & D? Please give						No
g	**Conclusion**						
	The conclusion is concise and relevance with the results and discussion			X			Write the conclusions more concise.
	The conclusion answer the research objective				X		
h	**Acknowledgment**						
	The acknowledgement statement after conclusion is clear and concise						No acknowledgment statement
i	**References**						
	Up to date references				X		
	Does the author use Number System for citation?						Yes

	All references are cited in the text?		
	All cited references are listed in the reference list?		
	Need additional references? Please give the specific suggestion		No
	Need to remove references? Please give the specific suggestion		No
j	**Specific comments, revisions and suggestions**		
	(1) Specific comments related to Grammarly evaluation: Grammarly Score = 80. Please resolve the grammatical errors in the manuscript to improve Grammarly Score to higher than 90		
	(2) Specific comments related to TurnItIn evaluation: Similarity index = 38, please paraphrase some sentences/paragraphs to avoid similarity to published publication and reduce similarity index into less than 15.		
	(3) Other specific comments to authors: (a) Please add relevance keywords as necessary (i.e., 5 phrases maximum), (b) Limit abstract to 200 words (maximum), (c) Write the conclusion more concise.		
	(4) Specific comments to editors: In general, manuscript is written quite well. However, the authors need to revise some of the grammatical errors and paraphrase sentences/paragraphs in the manuscript.		

2 Review wrap-up - Please give your overall accessments regarding the manuscript

	: > 90, The manuscript is acceptable without revision
	: 70 - 90, The manuscript is acceptable with revision
X	: 50 - 70, The manuscript require major revision
	: < 50, The manuscript is unacceptable, because (please describe the reason):

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Adaptation Capacity of Corn Farming to Climate Change: A Case Study in Pringsewu District, Lampung Province

Abstract. Climate change has become a global phenomenon and has an impact on the sustainability of farming. Farmers are required to have knowledge and capacity in dealing with climate change. This study aims to analyze the level of adaptation capacity of farmers to climate change and the factors that affect the level of adaptation capacity of farmers to climate change. The research was conducted on corn farming in Pringsewu Regency, Lampung in April and May 2022. The location was chosen intentionally with the consideration of corn centers in Lampung Province. The number of respondents was 30 farmers and the data were analyzed using a qualitative approach. The results showed that the level of knowledge of farmers in the research location on climate change is still low. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil cultivation and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques.

1. Introduction

Climate change has become a serious problem for the whole world. Data from the Intergovernmental Panel on Climate Change [1] shows that since 1850, there have been 12 hottest years based on global surface temperature data. Eleven of the 12 hottest years occurred in the last 12 years. The total temperature increase from 1850-1899 to 2001-2005 reached 0.76 Celsius [2]. Climate change has had an impact on fluctuations in rainfall, shifts in the rainy season and planting season and floods [3]. In addition, climate change also has an impact on rising sea surface temperatures, extreme weather intensity, rainfall patterns and large waves [4].

Agriculture is the sector most vulnerable to climate change [5]. Climate change has caused a decrease in rainfall intensity which has a direct impact on farming, especially on rainfed farming [6]. Every temperature increase of at least 1 degree Celsius will reduce rice yields by 10% [7] and an increase in temperature of 1 degree Celsius will reduce the production of other crops by 5-7% [8]. The decrease was due to reduced sink formation, shorter growth period, and increased respiration [9]. Climate change also causes air temperature and humidity to increase, which will trigger the growth and development of plant-disturbing organisms which in turn causes a decrease in farmer productivity and income [10].

Agriculture is an important sector for the Indonesian economy [11] because most of the Indonesian population mostly works in the agricultural sector [12]. The Central Statistics Agency (BPS) in 2021 stated that the number of Indonesians working in the agricultural sector was 38.23 million or around 29.76% [13]. Therefore, a decline in agricultural production has the potential to reduce the

welfare of the majority of Indonesia's population. It is interesting to study, the phenomenon of climate change has been proven to reduce agricultural yields [14]. Therefore, mitigation is needed to prevent the decline in agricultural yields due to climate change [15]. Unfortunately, currently there are still many farmers who do not know the phenomenon of climate change and have not mitigated climate change.

This research is focused on corn farming in Pringsewu Regency which is the center of corn in Lampung Province. Corn commodity was chosen as the object of research with the consideration that corn is grown on non-irrigated rainfed land which is dependent on rainwater, so that climate change has a significant impact on the sustainability of this farming. This research focuses on aspects of knowledge and the level of adaptation carried out by farmers due to climate change. This study aims to analyze the level of knowledge and adaptation capacity of corn farmers to climate change in Pringsewu Regency, Lampung Province.

2. Material and Methods

The research was designed with a descriptive survey approach in the Pekon Enggalrejo area, Adiluwih District, Pringsewu Regency. Descriptive survey research is used to describe the population being studied. The survey method is a process of taking samples from a population and using a questionnaire as the main data collection tool [16]. The location was chosen deliberately with the consideration that it is a corn farming center which has a large corn plantation area and is affected by climate change. The study was conducted between April and May 2022.

According to BPS data, the total population in Pekon Enggalrejo is 1403 people with a farmer household population of 456 households [17]. The sample size was set at 30 people who were drawn using a simple random technique. Determination of the sample is based on the theory proposed by Mahmud which states that for research using statistical data analysis, the minimum sample size is 30 [18]. So the number of samples is considered representative of the population to explain the level of knowledge and adaptation of farmers to climate change.

The type of data used in this study consisted of primary data and secondary data. Primary data was collected through structured interviews with a questionnaire instrument and secondary data was collected through reports, journals, and studies related to this research. In addition to collecting data through questionnaires, field observations were carried out to support the accuracy and depth of research data. The data analysis used a qualitative descriptive approach using a Likert scale to explain the level of knowledge and adaptation of farmers to climate change. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena [19] and uses several questions to measure individual behavior by responding to 5 choice points on each question item, strongly agree, agree, disagree, disagree, and strongly disagree [20].

3. Results and Discussion

3.1. Characteristics of Respondents

Characteristics of respondents based on age group, dominated by farmer respondents aged 41-60 years with 18 farmers (60%) and the rest in the range of 20-40 years and above 60 years (40%). This age group belongs to the productive age group and is able to manage farming activities optimally. At a productive age in general, a person is still possible to have the desire to improve skills and increase knowledge and farming capacity [21]. Based on gender, respondent farmers were dominated by male sex as many as 24 farmers (80%) and female respondents as many as 6 farmers (20%).

The education level of farmers is dominated by elementary school graduates with 12 farmers (40%) and junior high school graduates as many as 8 farmers (26.67%). There are 7 farmers who did not complete formal education (23.33%). The level of education has a correlation with the level of ability and explores the level of understanding of farmers about everything, both increasing knowledge, skills, and changing attitudes of farmers [21]. Therefore, farmer education becomes the capital in increasing the knowledge and adaptation capacity of farmers in climate change. Most of the farmers have farming experience above 10 years with a total of 26 farmers (86%) and farmers who have farming experience between 1-10 years only as many as 4 farmers (13.33%).

Table 1. Characteristics of respondents

No	Variable	Number of Respondents (n)	Percentage (%)
1	**Age (year)**		
	20-30	4	13.33
	31-40	5	16.33
	41-50	8	26.67
	51-60	10	33.33
	>60	3	10.00
2.	**Gender**		
	Men	24	80.00
	Women	6	20.00
3.	**Level of Education**		
	No formal education background	7	23.33
	Primary School (SD)	12	40.00
	Junior High School (SMP)	8	26.67
	Senior High School (SMA)	3	10.00
	Diploma/Bachelor	-	-
4.	**Farming Experience (year)**		
	1-10	4	13.33
	11-20	8	26.67
	21-30	11	36.67
	>30	7	23.33

Source : Primary Data (2022)

3.2. Farmers' Knowledge of Climate Change

The level of knowledge of farmers on climate change is low (Table 2). Of all farmers, knowledge of climate change is in the range of 40% to 70%. only 40% of farmers have knowledge of predicting climate change. This is an illustration that the ability of farmers to predict climate change is still low. Then, farmers have limitations in obtaining information related to climate change. Only 46.67% of farmers are aware of accessible resources related to climate change. The results of this study illustrate that the sources that are easily accessible to farmers in increasing understanding of climate change are still low.

Table 2. Farmers' level of knowledge on climate change

No	Indicator/Knowledge	Yes (%)	No (%)
1	Understanding of climate change	70.00	30.0
2	Sources of climate change information	46.67	53.33
3	Impact of climate change	66.67	33.33
4	Forms of climate change	53.33	46.67
5	Predicting climate change	40.00	60.00
6	Climate change adaptation	63.33	36.67

Source : Primary Data (2022)

Furthermore, farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. It takes hard work from various parties to increase farmers' understanding of climate change. Good knowledge can encourage farmers to anticipate and mitigate in reducing the adverse impacts of climate change on farming [23]. Farmers who have knowledge of climate change will act reactively and anticipate the impacts that occur as a result of climate change [24]. So that efforts to increase farmers' understanding of climate change must be carried out continuously.

3.3. Farmers Adaptation to Climate Change

The level of knowledge of corn farmers on climate change is low, but that does not mean farmers do not implement efforts and mitigation of climate change. However, farmers do not understand well that the adaptation is an effort to reduce the impact of climate change. Adaptation and mitigation of farmers to climate change is very important to do to reduce the potential for decreased production and crop failure [25].

Adaptation to climate change refers to adjustments in natural or human systems in response to actual or predicted climatic stimuli from the effects of climate change that are actually detrimental or potentially beneficial [1]. The adaptation actions taken cannot be separated from the knowledge possessed by the farmers themselves [23]. Farmer adaptation to climate change by corn farmers in the research location is shown in Figure 3.

Table 3. Farmers' adaptation to climate change

No	Indicator	Score	Category
1	Using high-yielding varieties	54	High
2	Changing tillage	43	Medium
3	Adjusting the planting time	53	High
4	Changing cropping pattern	27	Low
5	Changing watering technique	23	Low
6	Using organic fertilizer	38	Medium
7	Using plant-based pesticides	25	Low
8	Changes in pest control techniques	22	Low

Source : Primary Data (2022)

Score Range Description: Low (12-28), Medium (29-44), High (45-60)

Two indicators are classified as high, namely the use of superior varieties and adjustment of planting time. These two indicators have been continuously adopted by farmers. The use of superior varieties has been proven to have drought resistance, disease resistance, and high productivity [26]. The planting time indicator is classified as high because farmers plant corn based on the arrival of the rainy season and not based on past planting time habits. Currently, farmers have understood that planting time can change at any time so farmers must adjust when to plant so that the plants get enough rain.

Indicators categorized as moderate are soil cultivation and use of organic fertilizers. Tillage is divided into two phases, namely the first planting season (*rendeng*/rainy) and the second planting season (*ketigo*/dry). In the first growing season, the soil is well tilled using a tractor or plow. After plowing, the soil is loosened and given manure so that the soil is fertile and encourages high productivity. Optimal tillage in the first season is due to the availability of a long post-fall time. Unlike the first planting season, in the second planting season, farmers usually do not cultivate the soil. After clearing the land from corn plants, farmers immediately plant corn again without tilling the soil. This is done so that the corn plants get sufficient irrigation (rain). Usually, tillage takes about a week, and farmers feel that this time is too long and potentially the corn crop will not get enough rain. The use of organic fertilizers is grouped in the moderate category because farmers have understood the benefits of organic fertilizers that fertilize the soil and encourage the soil to be wet longer and encourage higher crop production [27].

Indicators classified as low are: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using plant-based pesticides, and 4) changing pest control techniques. The four categories did not change before and after the phenomenon of climate change. The cropping pattern used is still polyculture-intensive which requires high rainfall intensity and the potential for pest attacks. From the aspect of irrigation, farmers still rely on rain as the main source of irrigation for corn plants. There is no irrigation either through the construction of water reservoirs and wells for irrigation. OPT control still uses chemical pesticides and herbicides. The community considers the use of chemical pesticides and herbicides to be easier, cheaper and more efficient in controlling pests and weeds that interfere with corn

crops [28]. This causes the four indicators above to be grouped in the low category related to mitigation and adaptation by farmers to climate change.

4. Conclusion

The level of knowledge of farmers on climate change is low in the range of 40% to 70%. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil management and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques. The low level of knowledge and level of adaptation of corn farmers to climate change is a joint work of the parties to be able to encourage increased understanding and adaptability of farmers in dealing with climate change in order to encourage the sustainability of farming productivity and farmer welfare.

5. References

[1] Intergovermental Panel on Climate Change [IPCC]. 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability, IPCC. United Kingdom. Cambridge University Press.

[2] Surmaini, E., Runtunuwu, E., and Las, I. 2011. Upaya Sektor Pertanian Dalam Menghadapi Perubahan Iklim. *Jurnal Litbang Pertanian*, *30*(1):1-7.

[3] Julismin. 2013. Dampak Dan Perubahan Iklim Di Indonesia. *Jurnal Geografi*, *5*(1), 39-46.

[4] Nurhayati, D., Dhokikah, Y., and Mandala. 2020. Marga. Persepsi dan Strategi Adaptasi Masyarakat Terhadap Perubahan Iklim di Kawasan Asia Tenggara. *Jurnal Proteksi: Jurnal Lingkungan Berkelanjutan*, 1 **(**1): 39-44.

[5] Murniati K and Mutolib A 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia Biodiversitas. 21, 8: 3487-3493.

[6] Angles, S. Chinnadurai, M. and Sundar, A. (2011). Awareness on impact of climate change on dryland agriculture and coping mechanisms of dryland farmers. *Indian Journal of Agricultural Economics*, *66*(3): 365- 372.

[7] Peng, S., J. Huang, J.E. Sheelhy, R.C. Laza, R.M. Visperas, X. Zhong, G.S. Centeno, G.S. Khush, and K.G. Cassman. 2004. Rice yields decline with higher night temperature from global warming. Proc. Natl. Acad. Sci. USA.

[8] Sudarma, I.M., and As-syakur, A.R. 2018. Dampak Perubahan Iklim Terhadap Sektor Pertanian Di Provinsi Bali. *Journal on Socio-Economics of Agriculture and Agribusiness*, 12(1): 87-97.

[9] Matthews, R., and Wassmann, R. 2003. Modelling the impacts of climate change and methane emission reductions on rice production: a review. *European Journal of Agronomy*, 19(4): 573-598,

[10] Nuraisah, G., and Kusumo, R.A.B. 2019. Dampak Perubahan Iklim Terhadap Usahatani Padi Di Desa Wanguk Kecamatan Anjatan Kabupaten Indramayu. *Mimbar Agribisnis, Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, 5(1): 60-71

[11] Mutolib A, Rahmat A, Yanfika H, Listiana I, Rudy, Haryanto Y. 2020. Level of income, knowledge, and impact of climate change on fishing household in Limau Subdistrict, Tanggamus Regency. IOP Conference Series: Earth and Environmental Science 739 pp 1-8

[12] Aziz, I.A., Yantu, M.R., and Lamusa, A. (2015). The Role of Agricultural Sector in Economic at Morowali Regency. *e-J. Agrotekbis 3* (2): 212-221.

[13] Badan Pusat Statistik [BPS]. 2021. Statistik Indonesia 2021. Jakarta: Badan Pusat Statistik.

[14] Asnawi, R. 2015. Climate Change And Food Sovereignty In Indonesia. Review Product And Poverty. *Soso Informa*, 1(3): 293-309.
[15] Putri, F.A. and Suryanto. 2015. Strategi Adaptasi Dampak Perubahan Iklim Terhadap Sektor Pertanian Tembakau. Jurnal Ekonomi dan Studi Pembangunan, 13(1): 33-42
[16] Singarimbun, M. dan Effendi, S. 2006. Metode Penelitian Survey, Cetakan Kedelapan belas, Penerbit Pustaka LP3ES, Jakarta.
[17] Badan Pusat Statistik Kabupaten Pringsewu [BPS Pringsewu]. 2021. Kecamatan Adiluwih Dalam Angka 2021. Pringsewu: BPS Pringsewu.
[18] Mahmud, (2011). Metode Penelitian Pendidikan. Bandung: Pustaka Setia.
[19] Listiana, I., Yanfika, H., Bursan, R., Jimad, H., Riantini, M., Widyastuti, R.A.D., Mutolib, A., and Rahmat, A. 2021. Farmers Perception of Climate Change on Pepper (Pipper nigrum L.) Productivity of In East Lampung District. *IOP Conf. Series: Earth and Environmental Science 1027* (012021), 1-5.
[20] Likert RA. 1932. Technique for the measurement of attitudes. *Archives of Psychology*, 22(140): 1-55
[21] Yusmel, M.R., Afrianto, E., and Fikriman. 2019. Social Economic Factors that Affect the Success of Productivity of Farmers in Seling Village, Tabir District Merangin District. *Jurnal Agri Sains, 3* (1): 1-5.
[22] Manyamsari, I., and dan Mujiburrahmad. 2014. Karakteristik Petani Dan Hubungannya Dengan Kompetensi Petani Lahan Sempit (Kasus : Di Desa Sinar Sari Kecamatan Dramaga Kab. Bogor Jawa Barat). *Agrisep, 15* (2): 58-74.
[23] Hasanah, U. Lesmana, D., Imang, N. 2017. Pengetahuan Dan Adaptasi Petani Padi Sawah Terhadap Perubahan Iklim Di Girirejo Kelurahan Lempake Kecamatan Samarinda Utara. *Jurnal Ekonomi Pertanian & Pembangunan, 14* (2): 64-77.
[24] Negara, K.R.S., Antara, M. and Dhana, I.N. 2015. Hubungan tingkat pengetahuan petani tentang perubahaniklim dengan adaptasi budidaya stroberidi Desa Pancasari, Kecamatan Sukasada, Kabupaten Buleleng. *Ecotrophic, 9*(2) : 34-40
[25] Rasmikayati, E., Saefudin, B.R., Rochdiani, D., & Natawidjaja, R.S. (2020). Dinamika respon mitigasi petani padi di Jawa Barat dalam menghadapi dampak perubahan iklim serta kaitannya dengan pendapatan usaha tani. *Jurnal Wilayah dan Lingkungan, 8*(3), 247-260.
[26] Syahri dan Somantri, R.U. 2016. The Use of Improved Varieties Resistant to Pests and Diseases to Increase National Rice Production. *Jurnal Litbang Pertanian*, 35 (1): 25-36.
[27] Rahmah, A., Izzati, M. and Parman, S. 2014. Pengaruh Pupuk Organik Cair Berbahan Dasar Limbah Sawi Putih (Brassica chinensis L.) Terhadap Pertumbuhan Tanaman Jagung Manis (Zea mays L. var. Saccharata). *Buletin Anatomi dan Fisiologi, 22*(1): 65-71.
[28] Indiati, S.W. dan Marwoto. 2017. Penerapan Pengendalian Hama Terpadu (PHT) pada Tanaman Kedelai. *Buletin Palawija, 15* (2): 87-100

CRO-001_Abdul Mutolib and Candra Nuraini - Abdul Mutolib

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7	Comma misuse within clauses	
6	Wrong or missing prepositions	
2	Conjunction use	
1	Pronoun use	
10	Improper formatting	
2	Incorrect noun number	
1	Faulty subject-verb agreement	
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CRO-001_Abdul Mutolib and Candra Nuraini - Abdul Mutolib

Adaptation Capacity of Corn Farming to Climate Change: A Case Study in Pringsewu District, Lampung Province

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Abstract. Climate change has become a global phenomenon and has an impact on the sustainability of farming. Farmers are required to have knowledge and capacity in dealing with climate change. This study aims to analyze the level of adaptation capacity of farmers to climate change and the factors that affect the level of adaptation capacity of farmers to climate change. The research was conducted on corn farming in Pringsewu Regency, Lampung in April and May 2022. The location was chosen intentionally with the consideration of corn centers in Lampung Province. The number of respondents was 30 farmers and the data were analyzed using a qualitative approach. The results showed that the level of knowledge of farmers in the research location on climate change is

still low. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil cultivation and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques.

Introduction

Climate change has become a serious problem for the whole world. Data from the Intergovernmental Panel on Climate Change [1] shows that since 1850, there have been 12 hottest years based on global surface temperature data. Eleven of the 12 hottest years occurred in the last 12 years. The total temperature increase from 1850-1899 to 2001-2005 reached 0.76 Celsius [2]. Climate change has had an impact on fluctuations in rainfall, shifts in the rainy season and planting season and floods [3]. In addition, climate change also has an impact on rising sea surface temperatures, extreme weather intensity, rainfall patterns and large waves [4].

Agriculture is the sector most vulnerable to climate change [5]. Climate change has caused a decrease in rainfall intensity which has a direct impact on farming, especially on rainfed farming [6]. Every temperature increase of at least 1 degree Celsius will reduce rice yields by 10% [7] and an increase in temperature of 1 degree Celsius will reduce the production of other crops by 5-7% [8]. The decrease was due to reduced sink formation, shorter growth period,

and increased respiration [9]. Climate change also causes air temperature and humidity to increase, which will trigger the growth and development of plant-disturbing organisms which in turn causes a decrease in farmer productivity and income [10].

Agriculture is an important sector for the Indonesian economy [11] because most of the Indonesian population mostly works in the agricultural sector [12]. The Central Statistics Agency (BPS) in 2021 stated that the number of Indonesians working in the agricultural sector was 38.23 million or around 29.76% [13]. Therefore, a decline in agricultural production has the potential to reduce the welfare of the majority of Indonesia's population. It is interesting to study, the phenomenon of climate change has been proven to reduce agricultural yields [14]. Therefore, mitigation is needed to prevent the decline in agricultural yields due to climate change [15]. Unfortunately, currently there are still many farmers who do not know the phenomenon of climate change and have not mitigated climate change.

This research is focused on corn farming in Pringsewu Regency which is the center of corn in Lampung Province. Corn commodity was chosen as the object of research with the consideration that corn is grown on non-irrigated rainfed land which is dependent on rainwater, so that climate change has a significant impact on the sustainability of this farming. This research focuses on aspects of knowledge and the level of adaptation carried out by farmers due to climate change. This study aims to analyze the level of knowledge and adaptation capacity of corn farmers to climate change in Pringsewu Regency, Lampung Province.

Material and Methods

The research was designed with a descriptive survey approach in the Pekon Enggalrejo area, Adiluwih District, Pringsewu Regency. Descriptive survey

research is used to describe the population being studied. The survey method is a process of taking samples from a population and using a questionnaire as the main data collection tool [16]. The location was chosen deliberately with the consideration that it is a corn farming center which has a large corn plantation area and is affected by climate change. The study was conducted between April and May 2022.

According to BPS data, the total population in Pekon Enggalrejo is 1403 people with a farmer household population of 456 households [17]. The sample size was set at 30 people who were drawn using a simple random technique. Determination of the sample is based on the theory proposed by Mahmud which states that for research using statistical data analysis, the minimum sample size is 30 [18]. So the number of samples is considered representative of the population to explain the level of knowledge and adaptation of farmers to climate change.

The type of data used in this study consisted of primary data and secondary data. Primary data was collected through structured interviews with a questionnaire instrument and secondary data was collected through reports, journals, and studies related to this research. In addition to collecting data through questionnaires, field observations were carried out to support the accuracy and depth of research data. The data analysis used a qualitative descriptive approach using a Likert scale to explain the level of knowledge and adaptation of farmers to climate change. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena [19] and uses several questions to measure individual behavior by responding to 5 choice points on each question item, strongly agree, agree, disagree, disagree, and strongly disagree [20].

Results and Discussion

Characteristics of Respondents

Characteristics of respondents based on age group, dominated by farmer respondents aged 41-60 years with 18 farmers (60%) and the rest in the range of 20-40 years and above 60 years (40%). This age group belongs to the productive age group and is able to manage farming activities optimally. At a productive age in general, a person is still possible to have the desire to improve skills and increase knowledge and farming capacity [21]. Based on gender, respondent farmers were dominated by male sex as many as 24 farmers (80%) and female respondents as many as 6 farmers (20%).

The education level of farmers is dominated by elementary school graduates with 12 farmers (40%) and junior high school graduates as many as 8 farmers (26.67%). There are 7 farmers who did not complete formal education (23.33%). The level of education has a correlation with the level of ability and explores the level of understanding of farmers about everything, both increasing knowledge, skills, and changing attitudes of farmers [21]. Therefore, farmer education becomes the capital in increasing the knowledge and adaptation capacity of farmers in climate change. Most of the farmers have farming experience above 10 years with a total of 26 farmers (86%) and farmers who have farming experience between 1-10 years only as many as 4 farmers (13.33%).

Table 1. Characteristics of respondents

No

Variable

Number of Respondents (n)

Percentage (%)

1

Age (year)

20-30

4

13.33

31-40

5

16.33

41-50

8

26.67

51-60

10

33.33

>60

3

10.00

2.

Gender

Men

24

80.00

Women

6

20.00

3.

Level of Education

No formal education background

7

23.33

Primary School (SD)

12

40.00

Junior High School (SMP)

8

26.67

Senior High School (SMA)

3

10.00

Diploma/Bachelor

-

-

4.

Farming Experience (year)

1-10

4

13.33

11-20

8

26.67

21-30

11

36.67

>30

7

23.33

Source : Primary Data (2022)

Farmers' Knowledge of Climate Change

The level of knowledge of farmers on climate change is low (Table 2). Of all farmers, knowledge of climate change is in the range of 40% to 70%. only 40% of farmers have knowledge of predicting climate change. This is an illustration that the ability of farmers to predict climate change is still low. Then, farmers have limitations in obtaining information related to climate change. Only 46.67% of farmers are aware of accessible resources related to climate change. The results of this study illustrate that the sources that are easily accessible to farmers in increasing understanding of climate change are still low. Furthermore, farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. It takes hard work from various parties to increase farmers' understanding of climate change. Good knowledge can encourage farmers to anticipate and mitigate in reducing the adverse impacts of climate change on farming [23]. Farmers who have knowledge of climate change will act reactively and anticipate the impacts that occur as a result of climate change [24]. So that efforts to increase farmers' understanding of climate change must be carried out continuously.

Table 2. Farmers' level of knowledge on climate change

No

Indicator/Knowledge

Yes (%)

No (%)

1

Understanding of climate change

70.00

30.0

2

Sources of climate change information

46.67

53.33

3

Impact of climate change

66.67

33.33

4

Forms of climate change

53.33

46.67

5

Predicting climate change

40.00

60.00

6

Climate change adaptation

63.33

36.67

Source : Primary Data (2022)

Farmers Adaptation to Climate Change

The level of knowledge of corn farmers on climate change is low, but that does not mean farmers do not implement efforts and mitigation of climate change.

However, farmers do not understand well that the adaptation is an effort to reduce the impact of climate change. Adaptation and mitigation of farmers to climate change is very important to do to reduce the potential for decreased production and crop failure [25].

Adaptation to climate change refers to adjustments in natural or human systems in response to actual or predicted climatic stimuli from the effects of climate change that are actually detrimental or potentially beneficial [1]. The adaptation actions taken cannot be separated from the knowledge possessed by the farmers themselves [23]. Farmer adaptation to climate change by corn farmers in the research location is shown in Figure 3.

Table 3. Farmers' adaptation to climate change

No

Indicator

Score

Category

1

Using high-yielding varieties

54

High

2

Changing tillage

43

Medium

3

Adjusting the planting time

53

High

4

Changing cropping pattern

27

Low

5

Changing watering technique

23

Low

6

Using organic fertilizer

38

Medium

7

Using plant-based pesticides

25

Low

8

Changes in pest control techniques

22

Low

Source : Primary Data (2022)

Score Range Description: Low (12-28), Medium (29-44), High (45-60)

Two indicators are classified as high, namely the use of superior varieties and adjustment of planting time. These two indicators have been continuously adopted by farmers. The use of superior varieties has been proven to have

drought resistance, disease resistance, and high productivity [26]. The planting time indicator is classified as high because farmers plant corn based on the arrival of the rainy season and not based on past planting time habits. Currently, farmers have understood that planting time can change at any time so farmers must adjust when to plant so that the plants get enough rain. Indicators categorized as moderate are soil cultivation and use of organic fertilizers. Tillage is divided into two phases, namely the first planting season (rendeng/rainy) and the second planting season (ketigo/dry). In the first growing season, the soil is well tilled using a tractor or plow. After plowing, the soil is loosened and given manure so that the soil is fertile and encourages high productivity. Optimal tillage in the first season is due to the availability of a long post-fall time. Unlike the first planting season, in the second planting season, farmers usually do not cultivate the soil. After clearing the land from corn plants, farmers immediately plant corn again without tilling the soil. This is done so that the corn plants get sufficient irrigation (rain). Usually, tillage takes about a week, and farmers feel that this time is too long and potentially the corn crop will not get enough rain. The use of organic fertilizers is grouped in the moderate category because farmers have understood the benefits of organic fertilizers that fertilize the soil and encourage the soil to be wet longer and encourage higher crop production [27].

Indicators classified as low are: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using plant-based pesticides, and 4) changing pest control techniques. The four categories did not change before and after the phenomenon of climate change. The cropping pattern used is still polyculture-intensive which requires high rainfall intensity and the potential for pest attacks. From the aspect of irrigation, farmers still rely on rain as the main source of irrigation for corn plants. There is no irrigation either through the

construction of water reservoirs and wells for irrigation. OPT control still uses chemical pesticides and herbicides. The community considers the use of chemical pesticides and herbicides to be easier, cheaper and more efficient in controlling pests and weeds that interfere with corn crops [28]. This causes the four indicators above to be grouped in the low category related to mitigation and adaptation by farmers to climate change.

Conclusion

The level of knowledge of farmers on climate change is low in the range of 40% to 70%. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil management and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques. The low level of knowledge and level of adaptation of corn farmers to climate change is a joint work of the parties to be able to encourage increased understanding and adaptability of farmers in dealing with climate change in order to encourage the sustainability of farming productivity and farmer welfare.

References

[1] Intergovermental Panel on Climate Change [IPCC]. 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability, IPCC. United Kingdom. Cambridge

University Press.

[2] Surmaini, E., Runtunuwu, E., and Las, I. 2011. Upaya Sektor Pertanian Dalam Menghadapi Perubahan Iklim. Jurnal Litbang Pertanian, 30(1):1-7.

[3] Julismin. 2013. Dampak Dan Perubahan Iklim Di Indonesia. Jurnal Geografi, 5(1), 39-46.

[4] Nurhayati, D., Dhokikah, Y., and Mandala. 2020. Marga. Persepsi dan Strategi Adaptasi Masyarakat Terhadap Perubahan Iklim di Kawasan Asia Tenggara. Jurnal Proteksi: Jurnal Lingkungan Berkelanjutan, 1 (1): 39-44.

[5] Hidayati, I.N., and Suryanto. 2015. Pengaruh Perubahan Iklim Terhadap Produksi Pertanian Dan Strategi Adaptasi Pada Lahan Rawan Kekeringan. Jurnal Ekonomi dan Studi Pembangunan, 16 (1): 42-52

[6] Angles, S. Chinnadurai, M. and Sundar, A. (2011). Awareness on impact of climate change on dryland agriculture and coping mechanisms of dryland farmers. Indian Journal of Agricultural Economics, 66(3): 365- 372.

[7] Peng, S., J. Huang, J.E. Sheelhy, R.C. Laza, R.M. Visperas, X. Zhong, G.S. Centeno, G.S. Khush, and K.G. Cassman. 2004. Rice yields decline with higher night temperature from global warming. Proc. Natl. Acad. Sci. USA.

[8] Sudarma, I.M., and As-syakur, A.R. 2018. Dampak Perubahan Iklim Terhadap Sektor Pertanian Di Provinsi Bali. Journal on Socio-Economics of Agriculture and Agribusiness, 12(1): 87-97.

[9] Matthews, R., and Wassmann, R. 2003. Modelling the impacts of climate change and methane emission reductions on rice production: a review. European Journal of Agronomy, 19(4): 573-598,

[10] Nuraisah, G., dan Kusumo, R.A.B. 2019. Dampak Perubahan Iklim Terhadap Usahatani Padi Di Desa Wanguk Kecamatan Anjatan Kabupaten Indramayu. Mimbar Agribisnis, Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis, 5(1): 60-71

[11] Nadziroh, M.R.N. 2020. The Role Of The Agricultural Sector In Economic Growth In Magetan District. Jurnal AGRISTAN, 2(1): 52-60.

[12] Aziz, I.A., Yantu, M.R., and Lamusa, A. (2015). The Role of Agricultural Sector in Economic at Morowali Regency. e-J. Agrotekbis 3 (2): 212-221.

[13] Badan Pusat Statistik [BPS]. 2021. Statistik Indonesia 2021. Jakarta: Badan Pusat Statistik.

[14] Asnawi, R. 2015. Climate Change And Food Sovereignty In Indonesia. Review Product And Poverty. Soso Informa, 1(3): 293-309.

[15] Putri, F.A. and Suryanto. 2015. Strategi Adaptasi Dampak Perubahan Iklim Terhadap Sektor Pertanian Tembakau. Jurnal Ekonomi dan Studi Pembangunan, 13(1): 33-42

[16] Singarimbun, M. dan Effendi, S. 2006. Metode Penelitian Survey, Cetakan Kedelapan belas, Penerbit Pustaka LP3ES, Jakarta.

[17] Badan Pusat Statistik Kabupaten Pringsewu [BPS Pringsewu]. 2021. Kecamatan Adiluwih Dalam Angka 2021. Pringsewu: BPS Pringsewu.

[18] Mahmud, (2011). Metode Penelitian Pendidikan. Bandung: Pustaka Setia.

[19] Budiaji, W. 2013. The Measurement Scale and The Number of Responses in Likert Scale. Jurnal Ilmu Pertanian dan Perikanan, 2(2): 127-133.

[20] Likert RA. 1932. Technique for the measurement of attitudes. Archives of Psychology, 22(140): 1-55

[21] Yusmel, M.R., Afrianto, E., and Fikriman. 2019. Social Economic Factors that Affect the Success of Productivity of Farmers in Seling Village, Tabir District Merangin District. Jurnal Agri Sains, 3 (1): 1-5.

[22] Manyamsari, I., and dan Mujiburrahmad. 2014. Karakteristik Petani Dan Hubungannya Dengan Kompetensi Petani Lahan Sempit (Kasus : Di Desa Sinar Sari Kecamatan Dramaga Kab. Bogor Jawa Barat). Agrisep, 15 (2): 58-74.

[23] Hasanah, U. Lesmana, D., Imang, N. 2017. Pengetahuan Dan Adaptasi Petani Padi Sawah Terhadap Perubahan Iklim Di Girirejo Kelurahan Lempake Kecamatan Samarinda Utara. Jurnal Ekonomi Pertanian & Pembangunan, 14 (2): 64-77.

[24] Negara, K.R.S., Antara, M. and Dhana, I.N. 2015. Hubungan tingkat pengetahuan petani tentang perubahaniklim dengan adaptasi budidaya stroberidi Desa Pancasari, Kecamatan Sukasada, Kabupaten Buleleng. Ecotrophic, 9(2) : 34-40

[25] Rasmikayati, E., Saefudin, B.R., Rochdiani, D., & Natawidjaja, R.S. (2020). Dinamika respon mitigasi petani padi di Jawa Barat dalam menghadapi dampak perubahan iklim serta kaitannya dengan pendapatan usaha tani. Jurnal Wilayah dan Lingkungan, 8(3), 247-260.

[26] Syahri dan Somantri, R.U. 2016. The Use of Improved Varieties Resistant to Pests and Diseases to Increase National Rice Production. Jurnal Litbang Pertanian, 35 (1): 25-36.

[27] Rahmah, A., Izzati, M. and Parman, S. 2014. Pengaruh Pupuk Organik Cair Berbahan Dasar Limbah Sawi Putih (Brassica chinensis L.) Terhadap Pertumbuhan Tanaman Jagung Manis (Zea mays L. var. Saccharata). Buletin Anatomi dan Fisiologi, 22(1): 65-71.

[28] Indiati, S.W. dan Marwoto. 2017. Penerapan Pengendalian Hama Terpadu (PHT) pada Tanaman Kedelai. Buletin Palawija, 15 (2): 87-100

1.	*. Climate; . Farmers; . This; . The; . Only; . Farmers'; . Of; . Data; . Eleven; . In; . Climate; . Every; . Therefore; . It; . Unfortunately; . Corn; . Descriptive; . The; . Determination; . So; . Primary; . In; . At; . Based; . There; . Most; . Characteristics; . only; . Then; . Overall; . Go...*	Text inconsistencies	Correctness
2.	the knowledge	Determiner use (a/an/the/this, etc.)	Correctness
3.	~~in dealing~~ → to deal	Incorrect verb forms	Correctness
4.	*The research was conducted*	Passive voice misuse	Clarity
5.	, in	Punctuation in compound/complex sentences	Correctness
6.	*The location was chosen*	Passive voice misuse	Clarity
7.	considering	Wordy sentences	Clarity
8.	respondents were	Wordy sentences	Clarity
9.	, and	Punctuation in compound/complex sentences	Correctness
10.	*The results showed that the level of knowledge of farmers in the research location on climate change is still low.*	Unclear sentences	Clarity
11.	~~have knowledge of~~ → know about	Wordy sentences	Clarity
12.	*Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change.*	Unclear sentences	Clarity
13.	, and	Comma misuse within clauses	Correctness

14.	a medium	Determiner use (a/an/the/this, etc.)	Correctness
15.	*medium; Medium*	Text inconsistencies	Correctness
16.	severe problem for, severe problem to	Word choice	Engagement
17.	~~had an impact on~~ → impacted	Wordy sentences	Clarity
18.	, and	Comma misuse within clauses	Correctness
19.	~~impact~~ → effect	Word choice	Engagement
20.	~~has an impact on~~ → impacts	Wordy sentences	Clarity
21.	, and	Comma misuse within clauses	Correctness
22.	~~farming~~ → agriculture	Word choice	Engagement
23.	*Climate change has caused a decrease in rainfall intensity which has a direct impact on farming, especially on rainfed farming [6].*	Unclear sentences	Clarity
24.	~~reduce~~ → facilitate	Word choice	Engagement
25.	, which	Punctuation in compound/complex sentences	Correctness
26.	~~important~~ → essential	Word choice	Engagement
27.	~~for~~ → of	Wrong or missing prepositions	Correctness
28.	~~mostly~~ → mainly, primarily	Word choice	Engagement
29.	~~sector~~ → industry	Word choice	Engagement
30.	~~agricultural~~ → farm, farming	Word choice	Engagement
31.	~~sector~~ → industry	Word choice	Engagement

32.	, or	Punctuation in compound/complex sentences	Correctness
33.	can potentially	Wordy sentences	Clarity
34.	that the	Conjunction use	Correctness
35.	that the	Inappropriate colloquialisms	Delivery
36.	that the	Inappropriate colloquialisms	Delivery
37.	*It is interesting to study, the phenomenon of climate change has been proven to reduce agricultural yields [14].*	Unclear sentences	Clarity
38.	~~yields~~ → products, crops	Word choice	Engagement
39.	currently,	Comma misuse within clauses	Correctness
40.	about the	Wrong or missing prepositions	Correctness
41.	, which	Punctuation in compound/complex sentences	Correctness
42.	~~research~~ → study	Word choice	Engagement
43.	, which	Punctuation in compound/complex sentences	Correctness
44.	rainwater,	Punctuation in compound/complex sentences	Correctness
45.	~~that~~ climate	Conjunction use	Correctness
46.	*Corn commodity was chosen as the object of research with the consideration that corn is grown on non-irrigated rainfed land which is dependent on rainwater, so that climate change has a*	Unclear sentences	Clarity

	significant impact on the sustainability of this farming.		
47.	, and	Punctuation in compound/complex sentences	Correctness
48.	*This study aims to analyze the level of knowledge and adaptation capacity of corn farmers to climate change in Pringsewu Regency, Lampung Province.*	Unclear sentences	Clarity
49.	~~main~~ → primary	Word choice	Engagement
50.	*The survey method is a process of taking samples from a population and using a questionnaire as the main data collection tool [16].*	Unclear sentences	Clarity
51.	~~which has~~ → that has	Pronoun use	Correctness
52.	*The location was chosen deliberately with the consideration that it is a corn farming center which has a large corn plantation area and is affected by climate change.*	Unclear sentences	Clarity
53.	, with	Punctuation in compound/complex sentences	Correctness
54.	~~households~~	Wordy sentences	Clarity
55.	*The sample size was set*	Passive voice misuse	Clarity
56.	*who were drawn*	Passive voice misuse	Clarity
57.	, which	Punctuation in compound/complex sentences	Correctness
58.	*Determination of the sample is based on the theory proposed by Mahmud which states that for research using statistical*	Unclear sentences	Clarity

	data analysis, the minimum sample size is 30 [18].		
59.	*The type of data used in this study consisted of primary data and secondary data.*	Unclear sentences	Clarity
60.	~~Primary~~ → Preliminary	Word choice	Engagement
61.	, and	Punctuation in compound/complex sentences	Correctness
62.	*secondary data was collected*	Passive voice misuse	Clarity
63.	the research	Determiner use (a/an/the/this, etc.)	Correctness
64.	*The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena [19] and uses several questions to measure individual behavior by responding to 5 choice points on each question item, strongly agree, agree, disagree, disagree, and strong...*	Hard-to-read text	Clarity
65.	~~is able to~~ → can	Wordy sentences	Clarity
66.	~~a productive~~ → a formative, an effective	Word choice	Engagement
67.	, in	Punctuation in compound/complex sentences	Correctness
68.	the male	Determiner use (a/an/the/this, etc.)	Correctness
69.	, as	Punctuation in compound/complex sentences	Correctness
70.	~~6~~ → six	Improper formatting	Correctness

71.	~~8~~ → eight	Improper formatting	Correctness
72.	~~7~~ → seven	Improper formatting	Correctness
73.	7 farmers did	Wordy sentences	Clarity
74.	~~has a correlation~~ → correlates	Wordy sentences	Clarity
75.	~~and explores~~ → . It explores	Hard-to-read text	Clarity
76.	*Therefore, farmer education becomes the capital in increasing the knowledge and adaptation capacity of farmers in climate change.*	Unclear sentences	Clarity
77.	the farming, or a farming	Determiner use (a/an/the/this, etc.)	Correctness
78.	~~10~~ → ten	Improper formatting	Correctness
79.	, with	Punctuation in compound/complex sentences	Correctness
80.	, and	Punctuation in compound/complex sentences	Correctness
81.	~~who have~~ → with	Wordy sentences	Clarity
82.	, only	Punctuation in compound/complex sentences	Correctness
83.	~~4~~ → four	Improper formatting	Correctness
84.	Source :	Improper formatting	Correctness
85.	~~knowledge~~ → understanding	Word choice	Engagement
86.	*Of all farmers, knowledge of climate change is in the range of 40% to 70%.*	Unclear sentences	Clarity

87.	~~only~~ → Only	Improper formatting	Correctness
88.	~~have knowledge of~~ → know about	Wordy sentences	Clarity
89.	*This*	Intricate text	Clarity
90.	*This is an illustration that the ability of farmers to predict climate change is still low.*	Unclear sentences	Clarity
91.	, and	Comma misuse within clauses	Correctness
92.	*Overall, the level of knowledge of farmers in the research location on climate change is still low.*	Unclear sentences	Clarity
93.	~~in~~	Wrong or missing prepositions	Correctness
94.	~~in reducing~~	Wordy sentences	Clarity
95.	~~have knowledge of~~ → know about	Wordy sentences	Clarity
96.	~~anticipate~~ → predict	Word choice	Engagement
97.	~~impacts~~ → consequences, effects	Word choice	Engagement
98.	~~as a result of~~ → due to	Wordy sentences	Clarity
99.	~~that~~ efforts	Determiner use (a/an/the/this, etc.)	Correctness
100.	, efforts	Punctuation in compound/complex sentences	Correctness
101.	*that efforts to increase farmers' understanding of climate change must be carried out*	Passive voice misuse	Clarity
102.	~~on~~ → of	Wrong or missing prepositions	Correctness

103.	~~of~~	Wrong or missing prepositions	Correctness
104.	Source :	Improper formatting	Correctness
105.	~~Farmers~~ → Farmer's, Farmers'	Incorrect noun number	Correctness
106.	~~level of~~	Wordy sentences	Clarity
107.	~~the~~ adaptation	Determiner use (a/an/the/this, etc.)	Correctness
108.	*Adaptation and mitigation of farmers to climate change is very important to do to reduce the potential for decreased production and crop failure [25].*	Unclear sentences	Clarity
109.	~~is~~ → are	Faulty subject-verb agreement	Correctness
110.	~~very important~~ → significant, essential, critical, crucial	Word choice	Engagement
111.	~~reduce~~ → minimize	Word choice	Engagement
112.	~~actually~~	Wordy sentences	Clarity
113.	*The adaptation actions taken cannot be separated*	Passive voice misuse	Clarity
114.	*by the farmers*	Misplaced words or phrases	Correctness
115.	*The adaptation actions taken cannot be separated from the knowledge possessed by the farmers themselves [23].*	Unclear sentences	Clarity
116.	Source :	Improper formatting	Correctness
117.	*Two indicators are classified as high, namely the use of superior varieties and adjustment of planting time.*	Unclear sentences	Clarity
118.	*These two indicators have been continuously adopted by farmers.*	Passive voice misuse	Clarity

119.	~~superior~~ → excellent, select, special	Word choice	Engagement
120.	~~varieties~~ → types	Word choice	Engagement
121.	*The planting time indicator is classified as high because farmers plant corn based on the arrival of the rainy season and not based on past planting time habits.*	Unclear sentences	Clarity
122.	, so	Punctuation in compound/complex sentences	Correctness
123.	the use	Determiner use (a/an/the/this, etc.)	Correctness
124.	~~rendeng~~ → rendering, rendang	Misspelled words	Correctness
125.	~~ketigo~~ → keto	Misspelled words	Correctness
126.	*In the first growing season, the soil is well tilled using a tractor or plow.*	Unclear sentences	Clarity
127.	~~well tilled~~ → well-tilled	Misspelled words	Correctness
128.	~~soil~~ → ground, earth	Word choice	Engagement
129.	~~soil~~ → earth	Word choice	Engagement
130.	*Optimal tillage in the first season is due to the availability of a long post-fall time.*	Unclear sentences	Clarity
131.	*Unlike the first planting season, in the second planting season, farmers usually do not cultivate the soil.*	Unclear sentences	Clarity
132.	*This*	Intricate text	Clarity
133.	potentially,	Punctuation in compound/complex sentences	Correctness

134.	~~soil~~ → ground, earth	Word choice	Engagement
135.	, and	Punctuation in compound/complex sentences	Correctness
136.	*The use of organic fertilizers is grouped in the moderate category because farmers have understood the benefits of organic fertilizers that fertilize the soil and encourage the soil to be wet longer and encourage higher crop production [27].*	Unclear sentences	Clarity
137.	, which	Punctuation in compound/complex sentences	Correctness
138.	*The cropping pattern used is still polyculture-intensive which requires high rainfall intensity and the potential for pest attacks.*	Unclear sentences	Clarity
139.	~~main~~ → primary	Word choice	Engagement
140.	~~the use of~~	Wordy sentences	Clarity
141.	~~easier~~ → more accessible	Word choice	Engagement
142.	, and	Comma misuse within clauses	Correctness
143.	*This*	Intricate text	Clarity
144.	, in	Punctuation in compound/complex sentences	Correctness
145.	~~have knowledge of~~ → know about	Wordy sentences	Clarity
146.	*Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change.*	Unclear sentences	Clarity

147.	, and	Comma misuse within clauses	Correctness
148.	*Overall, the level of knowledge of farmers in the research location on climate change is still low.*	Unclear sentences	Clarity
149.	a medium	Determiner use (a/an/the/this, etc.)	Correctness
150.	~~in order to~~ → to	Wordy sentences	Clarity
151.	~~encourage~~ → promote	Word choice	Engagement
152.	*The low level of knowledge and level of adaptation of corn farmers to climate change is a joint work of the parties to be able to encourage increased understanding and adaptability of farmers in dealing with climate change in order to encourage the sustainability of farming productivity and farmer ...*	Unclear sentences	Clarity
153.	Intergovernmental	Misspelled words	Correctness
154.	The United	Determiner use (a/an/the/this, etc.)	Correctness
155.	, Chinnadurai	Punctuation in compound/complex sentences	Correctness
156.	~~on~~ → of	Wrong or missing prepositions	Correctness
157.	the impact	Determiner use (a/an/the/this, etc.)	Correctness
158.	~~Sheelhy~~ → Sheehy	Misspelled words	Correctness
159.	*K.G.; RA*	Text inconsistencies	Correctness
160.	~~temperature~~ → temperatures	Incorrect noun number	Correctness
161.	~~Modelling~~ → Modeling	Mixed dialects of English	Correctness

162.	~~e-J~~ → E-J	Improper formatting	Correctness

Adaptation Capacity of Corn Farming to Climate Change: A Case Study in Pringsewu District, Lampung Province

by Abdul Mutolib

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Adaptation Capacity of Corn Farming to Climate Change: A Case Study in Pringsewu District, Lampung Province

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Abstract. Climate change has become a global phenomenon and has an impact on the sustainability of farming. Farmers are required to have knowledge and capacity in dealing with climate change. This study aims to analyze the level of adaptation capacity of farmers to climate change and the factors that affect the level of adaptation capacity of farmers to climate change. The research was conducted on corn farming in Pringsewu Regency, Lampung in April and May 2022. The location was chosen intentionally with the consideration of corn centers in Lampung Province. The number of respondents was 30 farmers and the data were analyzed using a qualitative approach. The results showed that the level of knowledge of farmers in the research location on climate change is still low. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67% respectively. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil cultivation and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques.

1. Introduction

Climate change has become a serious problem for the whole world. Data from the Intergovernmental Panel on Climate Change [1] shows that since 1850, there have been 12 hottest years based on global surface temperature data. Eleven of the 12 hottest years occurred in the last 12 years. The total temperature increase from 1850-1899 to 2001-2005 reached 0.76 Celsius [2]. Climate change has had an impact on fluctuations in rainfall, shifts in the rainy season and planting season and floods [3]. In addition, climate change also has an impact on rising sea surface temperatures, extreme weather intensity, rainfall patterns and large waves [4].

Agriculture is the sector most vulnerable to climate change [5]. Climate change has caused a decrease in rainfall intensity which has a direct impact on farming, especially on rainfed farming [6]. Every temperature increase of at least 1 degree Celsius will reduce rice yields by 10% [7] and an increase in temperature of 1 degree Celsius will reduce the production of other crops by 5-7% [8]. The decrease was due to reduced sink formation, shorter growth period, and increased respiration [9]. Climate change also causes air temperature and humidity to increase, which will trigger the growth and development of plant-disturbing organisms which in turn causes a decrease in farmer productivity and income [10].

Agriculture is an important sector for the Indonesian economy [11] because most of the Indonesian population mostly works in the agricultural sector [12]. The Central Statistics Agency (BPS) in 2021 stated that the number of Indonesians working in the agricultural sector was 38.23 million or around 29.76% [13]. Therefore, a decline in agricultural production has the potential to reduce the welfare of the majority of Indonesia's population. It is interesting to study, the phenomenon of climate change has been proven to reduce agricultural yields [14]. Therefore, mitigation is needed to prevent the decline in agricultural yields due to climate change [15]. Unfortunately, currently there are still many farmers who do not know the phenomenon of climate change and have not mitigated climate change.

This research is focused on corn farming in Pringsewu Regency which is the center of corn in Lampung Province. Corn commodity was chosen as the object of research with the consideration that corn is grown on non-irrigated rainfed land which is dependent on rainwater, so that climate change has a significant impact on the sustainability of this farming. This research focuses on aspects of knowledge and the level of adaptation carried out by farmers due to climate change. This study aims to analyze the level of knowledge and adaptation capacity of corn farmers to climate change in Pringsewu Regency, Lampung Province.

2. Material and Methods

The research was designed with a descriptive survey approach in the Pekon Enggalrejo area, Adiluwih District, Pringsewu Regency. Descriptive survey research is used to describe the population being studied. The survey method is a process of taking samples from a population and using a questionnaire as the main data collection tool [16]. The location was chosen deliberately with the consideration that it is a corn farming center which has a large corn plantation area and is affected by climate change. The study was conducted between April and May 2022.

According to BPS data, the total population in Pekon Enggalrejo is 1403 people with a farmer household population of 466 households [17]. The sample size was set at 30 people who were drawn using a simple random technique. Determination of the sample is based on the theory proposed by Mahmud which states that for research using statistical data analysis, the minimum sample size is 30 [18]. So the number of samples is considered representative of the population to explain the level of knowledge and adaptation of farmers to climate change.

The type of data used in this study consisted of primary data and secondary data. Primary data was collected through structured interviews with a questionnaire instrument and secondary data was collected through reports, journals, and studies related to this research. In addition to collecting data through questionnaires, field observations were carried out to support the accuracy and depth of research data. The data analysis used a qualitative descriptive approach using a Likert scale to explain the level of knowledge and adaptation of farmers to climate change. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena [19] and uses several questions to measure individual behavior by responding to 5 choice points on each question item, strongly agree, agree, disagree, disagree, and strongly disagree [20].

3. Results and Discussion

3.1. Characteristics of Respondents

Characteristics of respondents based on age group, dominated by farmer respondents aged 41-60 years with 18 farmers (60%) and the rest in the range of 20-40 years and above 60 years (40%). This age group belongs to the productive age group and is able to manage farming activities optimally. At a productive age in general, a person is still possible to have the desire to improve skills and increase knowledge and farming capacity [21]. Based on gender, respondent farmers were dominated by male sex as many as 24 farmers (80%) and female respondents as many as 6 farmers (20%).

The education level of farmers is dominated by elementary school graduates with 12 farmers (40%) and junior high school graduates as many as 8 farmers (26.67%). There are 7 farmers who did not complete formal education (23.33%). The level of education has a correlation with the level of ability and explores the level of understanding of farmers about everything, both increasing knowledge, skills,

d changing attitudes of farmers [21]. Therefore, farmer education becom the capital in increasing the knowledge and adaptation capacity of farmers in climate change. Most of the farmers have farming experience above 10 years with a total of 26 farmers (86%) and farmers who have farming experience between 1-10 years only as many as 4 farmers (13.33%).

Table 1. Characteristics of respondents

No	Variable	Number of Respondents (n)	Percentage (%)
1	**Age (year)**		
	20-30	4	13.33
	31-40	5	16.33
	41-50	8	26.67
	51-60	10	33.33
	>60	3	10.00
2.	**Gender**		
	Men	24	80.00
	Women	6	20.00
3.	**Level of Education**		
	formal education background	7	23.33
	Primary School (SD)	12	40.00
	Junior High School (SMP)	8	26.67
	Senior High School (SMA)	3	10.00
	Diploma/Bachelor	-	-
4.	**Farming Experience (year)**		
	1-10	4	13.33
	11-20	8	26.67
	21-30	11	36.67
	>30	7	23.33

Source : Primary Data (2022)

3.2. Farmers' Knowledge of Climate Change

The level of knowledge of farmers on climate change is low (Table 2). Of all farmers, knowledge of climate change is in the range of 40% - 70%. only 40% of farmers have knowledge of predicting climate change. This is an illustration that the ability of farmers to predict climate change is still low. Then, farmers have limitations in obtaining information related to climate change. Only 46.67% of farmers are aware of accessible resources related to climate change. The results of this study illustrate that the sources that are easily accessible to farmers in increasing understanding of climate change are still low.

Furthermore, farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. It takes hard work from various parties to increase farmers' understanding of climate change. Good knowledge can encourage farmers to anticipate and mitigate in reducing the adverse impacts of climate change on farming [23]. Farmers who have knowledge of climate change will act reactively and anticipate the impacts that occur as a result of climate change [24]. So that efforts to increase farmers' understanding of climate change must be carried out continuously.

Table 2. Farmers' level of knowledge on climate change

No	Indicator/Knowledge	Yes (%)	No (%)
1	Understanding of climate change	70.00	30.0
2	Sources climate change information	46.67	53.33
3	Impact of climate change	66.67	33.33
4	Forms of climate change	53.33	46.67
5	Predicting climate change	40.00	60.00
6	Climate change adaptation	63.33	36.67

Source : Primary Data (2022)

3.3. Farmers Adaptation to Climate Change

The level of knowledge of corn farmers on climate change is low, but that does not mean farmers do not implement efforts and mitigation of climate change. However, farmers do not understand well that the adaptation is an effort to reduce the impact of climate change. Adaptation and mitigation of farmers to climate change is very important to do to reduce the potential for decreased production and crop failure [25].

Adaptation to climate change refers to adjustments in natural or human systems in response to actual or predicted climatic stimuli from the effects of climate change that are actually detrimental or potentially beneficial [1]. The adaptation action taken cannot be separated from the knowledge possessed by the farmers themselves [23]. Farmer adaptation to climate change by corn farmers in the research location is shown in Figure 3.

Table 3. Farmers' adaptation to climate change

No	Indicator	Score	Category
1	Using high-yielding varieties	54	High
2	Changing tillage	43	Medium
3	Adjusting the planting time	53	High
4	Changing cropping pattern	27	Low
5	Changing watering technique	23	Low
6	Using organic fertilizer	38	Medium
7	Using plant-based pesticides	25	Low
8	Changes in pest control techniques	22	Low

Source : Primary Data (2043)
Score Range Description: Low (12-28), Medium (29-44), High (45-60)

Two indicators are classified as high, namely the use of superior varieties and adjustment of planting time. These two indicators have been continuously adopted by farmers. The use of superior varieties has been proven to have drought resistance, disease resistance, and high productivity [26]. The planting time indicator is classified as high because farmers plant corn based on the arrival of the rainy season and not based on past planting time habits. Currently, farmers have understood that planting time can change at any time so farmers must adjust when to plant so that the plants get enough rain.

Indicators categorized as moderate are soil cultivation and use of organic fertilizers. Tillage is divided into two phases, namely the first planting season (*rendeng*/rainy) and the second planting season (*ketigo*/dry). In the first growing season, the soil is well tilled using a tractor or plow. After plowing, the soil is loosened and given manure so that the soil is fertile and encourages high productivity. Optimal tillage in the first season is due to the availability of a long post-fall time. Unlike the first planting season, in the second planting season, farmers usually do not cultivate the soil. After clearing the land from corn plants, farmers immediately plant corn again without tilling the soil. This is done so that the corn plants get sufficient irrigation (rain). Usually, tillage takes about a week, and farmers feel that this time is too long and potentially the corn crop will not get enough rain. The use of organic fertilizers is grouped in the moderate category because farmers have understood the benefits of organic fertilizers that fertilize the soil and encourage the soil to be wet longer and encourage higher crop production [27].

Indicators classified as low are: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using plant-based pesticides, and 4) changing pest control techniques. The four categories did not change before and after the phenomenon of climate change. The cropping pattern used is still polyculture-intensive which requires high rainfall intensity and the potential for pest attacks. From the aspect of irrigation, farmers still rely on rain as the main source of irrigation for corn plants. There is no irrigation either through the construction of water reservoirs and wells for irrigation. OPT control still uses chemical pesticides and herbicides. The community considers the use of chemical pesticides and herbicides to be easier, cheaper and more efficient in controlling pests and weeds that interfere with corn

crops [28]. This causes the four indicators above to be grouped in the low category related to mitigation and adaptation by farmers to climate change.

Conclusion

The level of knowledge of farmers on climate change is low in the range of 40% to 70%. Only 40% of farmers have knowledge of predicting climate change as much as 46.67% of farmers are aware of accessing sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, Climate change adaptation, and Impact of climate change) was 53.33%, 63.33% and 66.67%, respectively. Overall, the level of knowledge of farmers in the research location on climate change is still low. Of the eight adaptation indicators, two indicators are classified as high, namely the use of improved varieties and adjustment of planting time, two indicators are categorized as medium, namely soil management and the use of organic fertilizers, and four indicators are classified in the low category, namely: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using botanical pesticides, and 4) changing pest control techniques. The low level of knowledge and level of adaptation of corn farmers to climate change is a joint work of the parties to be able to encourage increased understanding and adaptability of farmers in dealing with climate change in order to encourage the sustainability of farming productivity and farmer welfare.

5. References

[1] Intergovermental Panel on Climate Change [IPCC]. 2001. Climate Change 2001: Impacts, Adaptation and Vulnerability, IPCC. United Kingdom. Cambridge University Press.

[2] Surmaini, E., Runtunuwu, E., and Las, I. 2011. Upaya Sektor Pertanian Dalam Menghadapi Perubahan Iklim. *Jurnal Litbang Pertanian*, *30*(1):1-7.

[3] Julismin. 2013. Dampak Dan Perubahan Iklim Di Indonesia. *Jurnal Geografi, 5*(1), 39-46.

[4] Nurhayati, D., Dhokikah, Y., and Mandala. 2020. Marga. Persepsi dan Strategi Adaptasi Masyarakat Terhadap Perubahan Iklim di Kawasan Asia Tenggara. *Jurnal Proteksi: Jurnal Lingkungan Berkelanjutan*, 1 (1): 39-44.

[5] Hidayati, I.N., and Suryanto. 2015. Pengaruh Perubahan Iklim Terhadap Produksi Pertanian Dan Strategi Adaptasi Pada Lahan Rawan Kekeringan. *Jurnal Ekonomi dan Studi Pembangunan*, 16 (1): 42-52

[6] Angles, S. Chinnadurai, M. and Sundar, A. (2011). Awareness on impact of climate change on dryland agriculture and coping mechanisms of dryland farmers. *Indian Journal of Agricultural Economics, 66*(3): 365- 372.

[7] Peng, S., J. Huang, J.E. Sheelhy, R.C. Laza, R.M. Visperas, X. Zhong, G.S. Centeno, G.S. Khush, and K.G. Cassman. 2004. Rice yields decline with higher night temperature from global warming. Proc. Natl. Acad. Sci. USA.

[8] Sudarma, I.M., and As-syakur, A.R. 2018. Dampak Perubahan Iklim Terhadap Sektor Pertanian Di Provinsi Bali. *Journal on Socio-Economics of Agriculture and Agribusiness*, 12(1): 87-97.

[9] Matthews, R., and Wassmann, R. 2003. Modelling the impacts of climate change and methane emission reductions on rice production: a review. *European Journal of Agronomy*, 19(4): 573-598,

[10] Nuraisah, G., dan Kusumo, R.A.B. 2019. Dampak Perubahan Iklim Terhadap Usahatani Padi Di Desa Wanguk Kecamatan Anjatan Kabupaten Indramayu. *Mimbar Agribisnis, Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, 5(1): 60-71

[11] Nadziroh, M.R.N. 2020. The Role Of The Agricultural Sector In Economic Growth In Magetan District. Jurnal AGRISTAN, 2(1): 52-60.

[12] Aziz, I.A., Yantu, M.R., and Lamusa, A. (2015). The Role of Agricultural Sector in Economic at Morowali Regency. *e-J. Agrotekbis 3* (2): 212-221.

[13] Badan Pusat Statistik [BPS]. 2021. Statistik Indonesia 2021. Jakarta: Badan Pusat Statistik.

[14] Asnawi, R. 2015. Climate Change And Food Sovereignty In Indonesia. Review Product And Poverty. *Soso Informa*, 1(3): 293-309.

[15] Putri, F.A. and Suryanto. 2015. Strategi Adaptasi Dampak Perubahan Iklim Terhadap Sektor Pertanian Tembakau. Jurnal Ekonomi dan Studi Pembangunan, 13(1): 33-42
[16] Singarimbun, M. dan Effendi, S. 2006. Metode Penelitian Survey, Cetakan Kedelapan belas, Penerbit Pustaka LP3ES, Jakarta.
[17] Badan Pusat Statistik Kabupaten Pringsewu [BPS Pringsewu]. 2021. Kecamatan Adiluwih Dalam Angka 2021. Pringsewu: BPS Pringsewu.
[18] Ahmud, (2011). Metode Penelitian Pendidikan. Bandung: Pustaka Setia.
[19] Budiaji, W. 2013. The Measurement Scale and The Number of Responses in Likert Scale. *Jurnal Ilmu Pertanian dan Perikanan,* 2(2): 127-133.
[20] Likert RA. 1932. Technique for the measurement of attitudes. *Archives of Psychology*, 22(140): 1-55
[21] Yusmel, M.R., Afrianto, E., and Fikriman. 2019. Social Economic Factors that Affect the Success of Productivity of Farmers in Seling Village, Tabir District Merangin District. *Jurnal Agri Sains, 3* (1): 1-5.
[22] Manyamsari, I., and dan Mujiburrahmad. 2014. Karakteristik Petani Dan Hubungannya Dengan Kompetensi Petani Lahan Sempit (Kasus : Di Desa Sinar Sari Kecamatan Dramaga Kab. Bogor Jawa Barat). *Agrisep, 15* (2): 58-74.
[23] Hasanah, U. Lesmana, D., Imang, N. 2017. Pengetahuan Dan Adaptasi Petani Padi Sawah Terhadap Perubahan Iklim Di Girirejo Kelurahan Lempake Kecamatan Samarinda Utara. *Jurnal Ekonomi Pertanian & Pembangunan, 14* (2): 64-77.
[24] Negara, K.R.S., Antara, M. and Dhana, I.N. 2015. Hubungan tingkat pengetahuan petani tentang perubahaniklim dengan adaptasi budidaya stroberidi Desa Pancasari, Kecamatan Sukasada, Kabupaten Buleleng. *Ecotrophic, 9*(2) : 34-40
[25] Rasmikayati, E., Saefudin, B.R., Rochdiani, D., & Natawidjaja, R.S. (2020). Dinamika respon mitigasi petani padi di Jawa Barat dalam menghadapi dampak perubahan iklim serta kaitannya dengan pendapatan usahatani. *Jurnal Wilayah dan Lingkungan, 8*(3), 247-260.
[26] Syahri dan Somantri, R.U. 2016. The Use of Improved Varieties Resistant to Pests and Diseases to Increase National Rice Production. *Jurnal Litbang Pertanian*, 35 (1): 25-36.
[27] Rahmah, A., Izzati, M. and Parman, S. 2014. Pengaruh Pupuk Organik Cair Berbahan Dasar Limbah Sawi Putih (Brassica chinensis L.) Terhadap Pertumbuhan Tanaman Jagung Manis (Zea mays L. var. Saccharata). *Buletin Anatomi dan Fisiologi, 22*(1): 65-71.
[28] Indiati, S.W. dan Marwoto. 2017. Penerapan Pengendalian Hama Terpadu (PHT) pada Tanaman Kedelai. *Buletin Palawija, 15* (2): 87-100

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Adaptation Capacity of Corn Farmer's to Climate Change: A Case Study in Pringsewu District, Lampung Province

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Abstract. Climate change has become a global phenomenon and impacts the sustainability of farming. Farmers are required to have the knowledge and capacity to deal with climate change. This study aims to analyze the level of adaptation capacity of farmers to climate change and the factors that affect the level of adaptation capacity of farmers to climate change. The research was conducted on corn farming in Pringsewu Regency, Lampung, from April to May 2022. The respondents were 30 farmers, and the data were analyzed using a qualitative approach. The results showed that farmers' knowledge level in the research location on climate change is still low. Only 40% of farmers know about predicting climate change, and 46.67% are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Forms of climate change, adaptation, and impact of climate change) was 53.33%, 63.33%, and 66.67%, respectively. Of the eight adaptation indicators, two are classified as high: the use of improved varieties and adjustment of planting time. Two indicators are categorized as medium, namely soil cultivation, and organic fertilizers, and four indicators are classified in the low category.

Keywords: Adaption, Capacity, Climate change, Corn farming,

1. Introduction

Climate change has become a severe problem for the whole world. Data from the Intergovernmental Panel on Climate Change [1] shows that since 1850, there have been 12 hottest years based on global surface temperature data. Eleven of the 12 hottest years occurred in the last 12 years. The total temperature increase from 1850-1899 to 2001-2005 reached 0.76 Celsius [2]. Climate change has impacted fluctuations in rainfall, shifts in the rainy season and planting season, and floods [3]. In addition, climate change also impacts rising sea surface temperatures, extreme weather intensity, rainfall patterns, and large waves [4].

Agriculture is the sector most vulnerable to climate change [5]. Climate change has caused a decrease in rainfall intensity which directly impacts farming, especially rainfed farming [6]. Every temperature increase of at least 1 degree Celsius will reduce rice yields by 10%, and an increase in temperature of 1 degree Celsius will reduce the production of other crops by 5-7% [7]. The decrease was due to reduced sink formation, shorter growth period, and increased respiration [8]. Climate change also causes air temperature and humidity, which will trigger the growth and development of plant-disturbing organisms, which in turn causes a decrease in farmer productivity and income [9].

Agriculture is an important sector of the Indonesian economy [10] because most of the Indonesian population primarily works in the agricultural sector [11]. The Central Statistics Agency (BPS) in 2021 stated that the number of Indonesians working in the agricultural sector was 38.23 million,

or around 29.76% [12]. Therefore, a decline in agricultural production can potentially reduce the welfare of the majority of Indonesia's population. It is interesting to study that climate change has been proven to reduce agricultural yields [13]. Therefore, mitigation is needed to prevent the decline in agricultural yields due to climate change [14]. Unfortunately, currently, many farmers do not know about the phenomenon of climate change and have not mitigated climate change.

This research focuses on corn farming in Pringsewu Regency, the center of corn in Lampung Province. Corn commodity was chosen as the object of research because corn is grown on non-irrigated rainfed land, dependent on rainwater. Hence, climate change significantly impacts the sustainability of this farming. This research focuses on aspects of knowledge, and the level of adaptation carried out by farmers due to climate change. This study aims to analyze the level of knowledge and adaptation capacity of corn farmers to climate change in Pringsewu Regency, Lampung Province.

2. Material and Methods

The research was designed with a descriptive survey approach in the Pekon Enggalrejo area, Adiluwih District, Pringsewu Regency. Descriptive survey research is used to describe the population being studied. In the survey method, the research sample is taken from the farmer population at the research location through interviews using a questionnaire [15]. The location was chosen deliberately because it is a corn farming center with a large corn plantation area and is affected by climate change. The study was conducted between April and May 2022.

According to BPS data, the total population in Pekon Enggalrejo is 1403 people, with a farmer household population of 456 households [16]. Therefore, the sample size was set at 30 people who were drawn using a simple random technique. The sample was chosen based on Mahmud's theory, which states that the minimum sample size for research using statistical data analysis is 30. In order to describe the degree of awareness and adaptation of farmers to climate change, the number of samples is therefore thought to be representative of the population.

This research was used the primary and secondary data. The secondary data were the two types of information used in this investigation. Secondary data was gathered from reports, journals, and studies associated with this research, while primary data was gathered through structured interviews using a questionnaire instrument. In addition to collecting data through questionnaires, field observations were carried out to support the accuracy and depth of the research data. The qualitative descriptive method of data analysis was used to explain the degree of knowledge and climate change adaptation of farmers using a Likert scale. The Likert scale is used to analyze a person's or a group of people's attitudes, views, and perceptions of social issues [17] and uses several questions to measure individual behavior by responding to 5 choice points on each question item, strongly agree, agree, disagree, disagree, and strongly disagree [18].

3. Results and Discussion

3.1. Respondents' Characteristics

Respondents were dominated by farmers aged 41-60 years, with 18 farmers (60%) and the rest in the range of 20-40 years and above 60 years (40%) (See Table 1). This age group belongs to the productive age group and can manage farming activities optimally. At a formative age, in general, a person may want to improve skills and increase knowledge and farming capacity [19]. Based on gender, respondent farmers were dominated by the male sex, with as many as 24 farmers (80%) and female respondents six farmers (20%)

Primary school graduates make up the majority of farmers' educational backgrounds, accounting for 12 farmers (or 40%), and junior high school graduates, with as many as eight farmers (26.67%). In addition, seven farmers did not complete formal education (23.33%). The level of education correlates with the level of ability and explores farmers' level of understanding about everything, increasing knowledge and skills and changing farmers' attitudes [20]. Therefore, farmer education becomes the capital in increasing the knowledge and ability farmers to adapt to climate change. Most of the farmers have over ten years of farming experience, with 26 farmers (86%) and farmers who have farming

experience between 1-10 years, only as many as four years (13.33%). The respondents' characteristics of corn farmers are shown in Table 1.

Table 1. Characteristics of respondents

No	Variable	Number of Respondents (n)	Percentage (%)
1	**Age (year)**		
	20-30	4	13.33
	31-40	5	16.33
	41-50	8	26.67
	51-60	10	33.33
	>60	3	10.00
2.	**Gender**		
	Men	24	80.00
	Women	6	20.00
3.	**Level of Education**		
	No formal education background	7	23.33
	Elementary School (*Sekolah Dasar*)	12	40.00
	Junior High School (*Sekolah Menengah Pertama)*	8	26.67
	Senior High School (*Sekolah Menengah Atas)*	3	10.00
	Bachelor or Diploma Degree	-	-
4.	**Farming Experience (year)**		
	1-10	4	13.33
	11-20	8	26.67
	21-30	11	36.67
	>30	7	23.33

Source : Primary Data (2022)

3.2. Farmers' Knowledge of Climate Change

Farmers have limited knowledge of climate change (Table 2). Of all respondents, the climate change knowledge is in the range of 40% to 70%. Only 40% of farmers have the knowledge predicting climate change. The farmers' ability to predict climate change is still low, and they have limitations in obtaining information related to climate change. Only 46.67% of farmers are aware of accessible resources related to climate change. The results of this study illustrate that the sources that are easily accessible to farmers in increasing understanding of climate change are still low.

Table 2. Farmers' level of knowledge on climate change

No	Indicator/Knowledge	Yes (%)	No (%)
1	Understanding of climate change	70.00	30.0
2	Sources of climate change information	46.67	53.33
3	Impact of climate change	66.67	33.33
4	Forms of climate change	53.33	46.67
5	Predicting climate change	40.00	60.00
6	Climate change adaptation	63.33	36.67

Source : Primary Data (2022)

Furthermore, farmers' knowledge of other aspects of climate change (Climate change forms, adaptation to climate change, and climate change effects) was 53.33%, 63.33%, and 66.67%, respectively. Overall, farmers' knowledge level in the research location on climate change is still low. It takes hard work from various parties to increase farmers' understanding of climate change. Good knowledge can encourage farmers to anticipate reduce the negative effects of climate change on agriculture especially on corn farming. Farmers who know about climate change will act reactively and

predict the effects that occur as a result of climate change [21]. So, efforts to increase farmers' understanding of climate change must be carried out continuously.

3.3. Climate Change Adaptation by Farmers

Corn farmers have limited knowledge of climate change, but that does not mean farmers do not implement efforts and mitigation of climate change (Table 3). However, farmers do not understand well that adaptation is an attempt to lessen the effects of climate change. Therefore, adaptation and mitigation of farmers to climate change significantly minimize the potential for decreased production and crop failure. The term "adaptation to climate change" describes modifications made to natural by human systems in response to present or anticipated climatic stressors that may be harmful or advantageous. [1]. Indicator of corn farmers in the study area have adapted to climate change is shown in Figure 3.

Table 3. Climate change adaptation by farmers

No	Indicator	Score	Category
1	Using high-yielding varieties	54	High
2	Changing tillage	43	Medium
3	Adjusting the planting time	53	High
4	Changing cropping pattern	27	Low
5	Changing watering technique	23	Low
6	Using organic fertilizer	38	Medium
7	Using plant-based pesticides	25	Low
8	Changes in pest control techniques	22	Low

Source : Primary Data (2022)

Score Range Description: 12-28 (Low category), 29-44 (Medium category), 45-60 (High category)

Two indicators are classified as high: the use of superior varieties and the adjustment of planting time. Farmers have continuously adopted these two indicators. Farmers have continuously adopted these two indicators. Special varieties have been proven to have drought resistance, disease resistance, and high productivity [22]. The planting time indicator is classified as high because farmers plant corn based on the rainy season's arrival and not on past planting time habits. Farmers have understood that planting time can change at any time, so farmers must adjust when to plant so that the plants get enough rain.

Indicators categorized as moderate are soil cultivation and the use of organic fertilizers. Tillage is divided into two phases, namely the first planting season (*rendeng/rainy*) and the second planting season (*ketigo/dry*). The soil is well-tilled in the first growing season using a tractor or plow. After plowing, the ground is loosened and given manure so that the earth is fertile and encourages high productivity. Optimal tillage in the first season is due to extended post-fall time availability. Farmers typically don't cultivate the soil in the second planting season, in contrast to the first. Farmers promptly plant corn again without tilling the soil after clearing the land from corn plants, this is done so that the corn plants get sufficient irrigation (rain). Usually, tillage takes about a week, and farmers feel that this time is too long and potentially, the corn crop will not get enough rain. Organic fertilizers are used in the moderate category because farmers understand the benefits of organic fertilizers that fertilize the soil, encourage the ground to be wet longer, and promote higher crop production [23].

Indicators classified as low are: 1) changing cropping patterns, 2) changing irrigation techniques, 3) using plant-based pesticides, and 4) changing pest control techniques. The four categories did not change before and after climate change. The cropping pattern used is still polyculture-intensive, which requires high rainfall intensity and the potential for pest attacks. From the aspect of irrigation, farmers still rely on rain as the primary source of irrigation for corn plants. There is no irrigation either through the construction of water reservoirs and wells for irrigation. Finally, OPT control still uses chemical pesticides and herbicides. The farmers believe that chemical pesticides and herbicides are

easier to use, more affordable, and more effective at eradicating weeds and pests that interfere with maize production [24]

4. Conclusion

Farmers have limited knowledge of climate change between 40% and 70%. Only 40% of farmers know about predicting climate change, and 46.67% are aware of accessible sources related to climate change. Farmers' knowledge of other aspects of climate change (Climate change forms, adaptation to climate change, and climate change effects) was 53.33%, 63.33%, and 66.67%, respectively. Overall, farmers' knowledge level in the research location on climate change is still low. Of the eight adaptation indicators, two are classified as high: the use of improved varieties and adjustment of planting time. Two other indicators are in the medium category, and the other four are categorized as low.

5. Acknowledgment

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6. References

[1] IPCC 2001 *Climate Change 2001: Impacts, Adaptation and Vulnerability, IPCC* (Cambridge: Cambridge University Press).
[2] Surmaini E, Runtunuwu E and Las, I 2011 *Jurnal Penelitian dan Pengembangan Pertanian*. **30** (1):1-7.
[3] Julismin 2013 *Jurnal Geografi*. **5**(1), 39-46.
[4] Nurhayati D, Dhokikah Y and Mandala 2020 *Jurnal Proteksi: J. Ling. Berkelanjutan*. **1 (**1): 39-44.
[5] Murniati K and Mutolib A 2020 *Biodiversitas.* **21** 8: 3487- 3493.
[6] Angles S, Chinnadurai M and Sundar A 2011 *Indian Jour. of Agri. Economics.* 66(3): 365- 372.
[7] Sudarma IM and As-syakur AR 2018 *Journal on Socio-Economics of Agriculture and Agribusiness*. **12**(1): 87-97.
[8] Matthews R and Wassmann R 2003 *European Journal of Agronomy* **19** (4): 573-598,
[9] Nuraisah G and Kusumo RAB 2019 *Mimbar Agribisnis* **5**(1): 60-71
[10] Mutolib A, Rahmat A, Yanfika H, Listiana I, Rudy, Haryanto Y 2020 *IOP EES.* **739** 012041
[11] Aziz IA, Yantu MR and Lamusa, A 2015 *e-J. Agrotekbis.* **3** (2): 212-221.
[12] Badan Pusat Statistik [BPS] 2021 *Statistik Indonesia 2021* (Jakarta: Badan Pusat Statistik)
[13] Asnawi R 2015 *Soso Informa*. **1** (3): 293-309.
[14] Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H and Listiana I 2019 *Journal of Physics: Conference Series*. **1155** (012070): 1-7
[15] Singarimbun M and Effendi S 2006. *Metode Penelitian Survey, Cetakan-12* (Jakarta: Penerbit Pustaka LP3ES).
[16] Badan Pusat Statistik Kabupaten Pringsewu [BPS Pringsewu] 2021 *Kecamatan Adiluwih Dalam Angka 2021* (Pringsewu: BPS Pringsewu)
[17] Listiana I, Yanfika H, Bursan R, Jimad H, Riantini M, Widyastuti RAD, Mutolib A and Rahmat A 2021 *IOP Conf. Series: Earth and Environmental Science*. **1027** 012021
[18] Likert RA 1932 *Archives of Psychology*. **22** (140): 1-55
[19] Yusmel MR, Afrianto E and Fikriman 2019 *Jurnal Agri Sains* **3** (1): 1-5.
[20] Manyamsari I and Mujiburrahmad 2014 *Agrisep **15*** (2): 58-74.
[21] Negara KRS, Antara M and Dhana IN 2015 *Ecotrophic* **9**(2) : 34-40
[22] Syahri and Somantri RU 2016 *Jurnal Litbang Pertanian* **35** (1): 25-36.
[23] Rahmah A, Izzati M & Parman S 2014 Buletin Anatomi dan Fisiologi. 22 (1): 65-71.
[24] Indiati SW and Marwoto 2017 *Buletin Palawija* **15** (2): 87-100

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